What do these figures mean? Simply this, that with the premise stated, a steam horsepower year cost generated at the mine falls to the cost at Niagara Falls, which has the advantage of high hydraulic head and favorable environment, and much below that at Keokuk, with low hydraulic head and less favorable environment for the sale of power.

What next follows? Three things plainly:

1. It will then be ridiculous to haul coal by railroad cars at 50 miles a day when we can send its equivalent 180,000 miles a second by high tension current to points of consumption.

2. Our railroads might be relieved in this way of say 300 million tons of low priced haul.

3. Our railroads will find electric traction with generating station at mine cheaper and better than the steam locomotive.

Is it not pertinent to inquire whether the large expansion of our railroads generally supposed to be necessary cannot largely be met by canceling this vast unnecessary coal tonnage movement? Surely anyone knows that coal transportation, with its heavy wheel loads, is the principal cause of wear and tear on the permanent way of our railroads.

A distinguished man a few years ago affronted many good people by the declaration that our railroads might by economy save a million dollars a day. Those same good people would now view the allegation as one coming from a piker in its moderation.

How strong is the force of habit. What sense is there in hauling millions of tons of hard coal 700 miles to Chicago, or 1000 miles to Kansas City, when the local fuel merely by a shift in well known procedure will do as well? We contemplate with pain the coming or perhaps already arrived depression—with its involved suffering. Will a time ever come, when by an intellectual process, drawing from the stock of knowledge you men have collected and digested, we can avert a depression, by applying the proper remedy? Must we go on forever in the dark, learning only as the burnt child avoids the fire? Shall we go on forever suffering want, just because we have too much of what we want?

THE BITUMINOUS COAL INDUSTRY—DISCUSSION

ARTHUR E. SUFFERN.—Most of the facts brought out by the various papers on this subject are so *very* true that we are tempted to refuse to see their full implications. The public has been discontented with the situation in the coal industry for some time. Even though it is recognized that there is a public problem in relation to the coal industry, it will be difficult to find instrumentalities formidable and effective enough to cope with it.

One can hardly fail to be impressed with the analysis of the elements of the problem which the papers on this subject have presented. Moreover, some practical measures have been pointed out for dealing with technical improvements, operation, transportation, storage, distribution, standardiza-

tion of product, and the improvement of the conditions of human life in the industry. But they all seem to be dependent for effectiveness upon the way they are fitted into some comprehensive plan for dealing with the industry as a whole.

The most important aspect of the problem would seem to be what has been called the "deflation of mining capacity." Improvements in technical processes of production, greater conservation of resources, and the more adequate use of transportation facilities all are largely dependent upon careful adjustment of mining capacity to meet the needs of the nation. Overinvestment in times of prosperity, seasonal fluctuation in demand, and glutted markets have formed a sequence which has been the greatest retarding factor in the development of a more efficient mining process and in the relief from congestion of transportation.

Suppose we assume that we wish not merely to conserve our resources but that we desire to get higher returns from what we do use. Suppose we assume that we wish to give investors a fair return upon capital, the laborers a compensation permitting decent and progressive American citizenship, and the consumers the best quality of coal possible at the lowest possible expense. Suppose we make no attempt to go as far as the best production engineers in many countries say we should go in dealing with the industry according to the best known science at our command.

In an attempt to accomplish deflation of mining capacity with these assumptions present, the formation of an adequate plan must rest upon the selection of effective soverign powers under our present constitutional arrangements. We must also have a basis of regulation which would be broad and effective enough to enable us to obtain real conservation, to enforce the exploitation of the thick veins or the thin veins and the best grades or low grades of coal to suit our needs, to require the recovery of the maximum percentage of coal at the minimum expense, to control technical processes and the use of equipment, to standardize and enforce accounting, to regulate distribution, to standardize coal according to quality, to deal with wages and conditions of labor, and to provide for increasingly greater coöperation between managers and workers.

These factors all demand immediate consideration in connection with production. Of course it is possible only in theory to separate production from distribution and consumption for purposes of special study of particular aspects of the problems involved. It would seem that we already have adequate powers of regulation of transportation to coördinate it with a scheme of coal control. Moreover, the control over transportation might easily be elaborated in a way to practically compel communities to provide storage and receive their allotments at the proper time. To what extent communities could be induced to reform their methods of use and distribution of coal would probably depend, at first, more upon the demonstration of efficiency and saving in cities which tried it than upon the possibilities of harmonizing sovereign powers in states and localities or the extension of federal regulation.

One thing is certain: we shall make a choice in connection with this problem whether we wish to or not. Either we shall seek adequate powers and procedure for regulation, or we shall permit the waste and concentration of power which has obtained in the anthracite field. The latter alternative is apt to occasion a much more prolonged period of waste and less effective

control in the bituminous field than has resulted in the anthracite industry. Moreover, we shall ultimately face conditions in both the anthracite and bituminous fields which will compel a policy of regulation. If this is true, all parties concerned, owners, workers, and consumers, cannot do better than agree upon and work for a plan founded upon adequate sovereign powers, enforced through effective organization.

From the best information I can get from those versed in constitutional law, such a basis of power might be obtained through a law extending the federal powers to control businesses under licenses. The power to control through licenses might be supplemented by the power to control interstate commerce, by the power of eminent domain, by the taxing power, and even by the war powers. As a last resort a basis of power might be obtained through a federal amendment.

It should be entirely reasonable to suggest that nations depending increasingly upon industries for growth and progress, and that consumers in cities depending completely upon coal for warmth and health, will ultimately demand an effective basis of control to meet these needs regardless of the obstacles that may now seem to hinder its attainment.

PERCY TETLOW.—It is a privilege I greatly appreciate to make a statement before the American Economic Association, whose members long since have abandoned the conception of economics which caused it to be called the dismal science. According to the old doctrine wages could never rise above the level necessary to provide enough workers to supply the needs of humanity, as any increase above that minimum would cause the workers to "breed" more rapidly and to multiply until the supply of labor would be so plentiful that only a subsistence wage would be available for each worker. That was indeed a dismal doctrine; aye, a brutal doctrine. None of you, gentlemen, adheres to it. You know that every industry in order to justify its support by the consuming public must provide for the workers engaged in it, not a subsistence minimum that would enable them to live like beasts or savages, but a living wage sufficient to support them and their families in accordance with the American standard of living, which comprises not only food, clothes, and shelter, but also enough to provide a decent education for the children, to afford opportunity for self-betterment, amusement, and recreation, and to make it possible for the worker and his wife to take part in the religious and civic life of the community. With this conception of a living wage you are, I am certain, all in accord as economists and as citizens of a democracy; and it is for this idea, universally admitted in theory and sanctioned by the highest religious and political authority, but grossly disregarded by many of the managers of our industries, that the United Mine Workers contend.

We did not receive a living wage before the war. At a time when $800 a year was considered by the best students of the subject as the minimum necessary to maintain a decent existence, the majority of bituminous coal miners were earning only between $400 and $600 a year, and their average earnings were only $451. Then came the war and the enormous rise in living costs. The mine workers patriotically agreed to stick to their jobs and to ask for no improvement in their economic conditions so long as the struggle lasted. But the dollars in their pay envelopes were continually shrinking in purchasing power, and the miners in self-preservation were

obliged to request on several occasions to have their money wages increased in order to keep their real wages from dropping. They had to run very fast to remain where they were. The requests were granted on some occasions and refused on others. Out of the last refusal grew the strike of 1919 and the appointment of the Bituminous Coal Commission. This Commission considered our case and granted us an increase about twice as large as that proposed by the Fuel Administrator, Dr. Garfield, and rejected by the miners. The Commission's award gave us a wage approximating in purchasing power our prewar earnings. But it granted us no improvement over our prewar economic condition.

The war is over, gentlemen, and this is the time to make it clear that we are no longer wedded to the index number. We were willing to abide by its decrees so long as a national emergency made all thought of personal gain unpatriotic. We stuck to this resolution, although our employers did not scruple to make large profits out of the nation's need and our patriotic sacrifices. But we now declare our independence of the index number based on 1913 as 100 per cent Americanism. We claim that our condition in 1913 was not American, not acceptable to a self-respecting community of workers. We are instead willing to accept the decision of another figure emanating from the same source as the index number, based not on any year as an ideal, but on the amount of commodities and services required by a family in order to maintain a standard of health and decency. The United States Bureau of Labor Statistics has worked out such a budget of physical quantities, and its cost in our present day dollars is roughly $2240 a year. Those of you who have not seen the budget are respectfully referred to it. It is not extravagant; it is very economical and conservative, but it does grant the essentials of a decent life, without resorting to the keeping of boarders and lodgers, and thus sacrificing the privacy of our homes and the strength of our women, or to child labor, and thus ruining the future of our children.

American consumers, I am certain, are willing to pay enough for their coal to support the miners according to this standard and to afford a reasonable return to the capital invested. They are willing to pay such a price, provided they are assured that the returns to labor and capital are only reasonable and that the pay received is for constant work throughout the year and not for work for two-thirds of the year and idleness for the other third. The mine workers are more than willing, they are anxious, to work 300 days or more a year, but, for reasons no doubt made clear to you by those who have addressed you in person, they have not been granted work every working day of the year, or even for a reasonably sufficient number of days in the year. We have proposed to provide for all-year employment by limiting our work to 30 hours a week, the actual weekly average of working hours given us through periods of excessive work alternating with excessive idleness. This proposal was rejected by the Bituminous Coal Commission and called an economic fallacy. Perhaps it was; we are not economists, but working men who know the mental anguish and the demoralizing effect of irregular employment. We are willing to take counsel with you who are economists as to what is the best way to assure to us an even flow of work that will take care of our needs and at the same time not tax the consumer for more than the value of services rendered. Would a wage fixed on an annual basis accomplish the result, by eliminating the mines

which cannot compete on the basis of full-time labor costs? Or do we need price fixing and wage fixing by a sovereign power? This, gentlemen, is a problem of vital national importance, its proper solution calls for the application of the best brains of the country, coupled with understanding hearts not willing to sacrifice the welfare of hundreds of thousands of miners to the dollar in the pocket of the producer, the middleman, or the consumer. And it is on members of such organizations as the American Economic Association that rests the duty to enlighten and guide public opinion toward a proper understanding and an equitable solution of the problems confronting the bituminous coal industry. We hope and trust that in working out this solution you will not lose sight of the miner, the ultimate producer, who labors in the bowels of the earth so that the wheels of industry may continue to revolve and millions of homes in this land may be kept warm in the heart of winter. I thank you, gentlemen, for the privilege of making this statement.

HUGH ARCHBALD.—A man said to me the other day, "I have a peach of a mine foreman. He cannot read or write but he can make the coal come out." The man who made that remark is a college graduate—energetic, aggressive, of the executive type.

On that story I wish to hang my tale, for, although that incident is an exaggeration from the usual, still circumstances have put the daily life of the men in the mines and their opportunity for earning, as well as the contents of the pocketbooks of owners of mines, into the hands of many such men as that foreman. And damage is done to both parties.

Coal mining is governed by law as no other industry is. It is governed for the sake of the safety of the men employed in the mines. Each state in which there are coal mines has its own code of laws. In some the mine code is very detailed as to what shall be done to protect the lives of the men; in others the law is merely general. The purpose of the law is given as "efficient management," but the provisions of the law go no farther than measures for safety.

One customary section of the law is that mine foremen shall pass a state examination, and another is that the operator shall employ a certified mine foreman who shall have full charge of all work inside of the mine. To get a certificate a man must work in the mines for five years (in Illinois I believe that it is only four years) and the law requires that he shall be a "practical" man.

The intermittent operation of mines makes it necessary that he shall be a cheap man. For expense piles up during idle times. When mines are in operation only two days out of three, then the overhead must be kept as small as possible. So you have men who are now being paid from $200 to $250 a month in charge of all the work of mines employing from 100 to 500 men. In the days when I was a mine foreman, the position paid $125 a month. And the mine where I was working employed between 550 and 600 men, with a monthly payroll of $35,000 to $40,000. The value of the mine can be gauged by the fact that it had changed hands a couple of years before at $600,000, and in addition $250,000 had been spent in rehabilitating it for operation. The foremen of the same company are now being paid $215 a month.

To work long years at manual labor in order to obtain an underpaid job

is hardly a likeable proposition for a college man, or even a high school graduate. So the field is left open to the man who has worked up through the practical work of the mines.

I do not desire to make fun of those who hold the position of mine foreman. For I know many of them intimately and respect them as loyal and hard working men. Personally they are a likeable lot. Most of the practical men who are now mine foremen began working in the old days when there were no child labor laws. Many a man has remarked to me that he was first carried into the mines in his father's dinner bucket, meaning that he was very young when he started to work. As a matter of fact many a man boasts about having started when he was nine years old. Often so much pride is taken in the fact of a youthful start that some men even look down upon those who waited till they were ten years old before commencing to work.

So you have men in charge of the work of other men who have laid track, swung a pick, stood timber, and done all the work there is to do in mining coal. But the doing of work is not an education in that main part of management, which is the coördination of work. The practical man can be forgiven for not realizing the importance of this element of managing mines when you realize that it is a subject which is not taught in colleges.

Coördination of work is an engineering proposition, and there is a difference between engineering and superintendence of work. The one requires the opportunity to stay still while details of work are measured and a whole planned. The other requires constant movements from job to job in order to keep things moving. The mine foreman has to do both elements of the work.

There is an area to cover in coal mining which the stranger does not realize. A mine which is just starting may have a mile of openings into the ground. A mine which has been going for a number of years may easily cover a couple of hundred acres. The men who are doing the mining will be scattered on the outside edge of this acreage. Remember that it is in the dark and that there are many turnings and openings.

Now just as intermittent work requires a cheap foreman, so it also requires that few be employed. The law requires that each working place in the mines—each place where coal is being dug—shall be visited once a day. The mine foreman has to sign a book that he has complied with this provision. It is a requirement for the safety of the men, but the mere visiting of working places takes up so much time that the supervision of the work which goes on in the interior of the acreage of a mine and which ties all the other work together cannot be thoroughly attended to. The routes which a foreman may be expected to cover are generally long. In one case it took me sixteen hours to walk the route which a second assistant mine foreman was expected to cover every morning in four hours. As a result the men who could not be thoroughly supervised while at work had to find their own work and do it too.

Other papers have detailed to you the fluctuation in the operation of mines. But they hardly tell you how fluctuating everything around a mine is, or how that fluctuation has had its effect upon the men to breed bad habits.

A friend of mine—a house painter by trade—remarked the other day that he had employed many a miner to help him, but that it was no use; they were no good, for they would work good till nine o'clock, but at nine they

would have to sit down and eat a lunch. From nine till noon they would work "fair," but after noon you might as well send them home for they were no good at all.

What he said was true. It is an example of the characteristics of coal mining. The miners are not really to be blamed for their bad habits. They are the result of the environment of their work. For 150 years—all the life of coal mining—we have bred bad habits. And for all that time we have had the same causes for strikes and industrial unrest.

For instance, to get around the situation which exists in the supervision of work, in order to get the output, more men are employed in a mine than are needed. And just as there are more mines in the country than are needed for the output which can be consumed, there are more men in the individual mines. I have never yet seen a mine which did not have too many men. Many a mine is all cluttered up with men, so many men that they get in one another's way. Such a situation has a bad effect on the men.

You cannot sit in Washington or Philadelphia or New York and get the facts about coal mining. You must get out at the mines. The costs of coal mining have been given to you as gathered by the Federal Trade Commission. In the lump sum these figures are valuable, but in details they are—I was going to say—not worth the paper they are written on.

You cannot expect the usual practical man around the mines to understand how to study cost sheets. Cost accounting is a paper and pencil job, which swinging a pick and shovel will tell you nothing about. I know as a mine foreman I served under a superintendent who had spent sixty-five of his seventy odd years in the mines and who literally had to put two and two down on a piece of paper to add them together. As an example of how the details of the ordinary mine cost sheets are incorrect, I would explain that this superintendent limited us in the number of pumpmen and timbermen we could employ. It so happened that we were employing the limit of pumpmen and needed another, but we were not employing our limit of timbermen. So we employed a man, labeling him timberman and paying him at the higher rate and using him as a pumpman. As a result in the accounting both our pumping and timbering costs were incorrect.

Coal mining is really a transportation problem underground. For in each mine there exists many miles of narrow guage track and there is the problem of the distribution of cars. It is the same problem which exists on the surface of the earth in the operation of railroads. And each individual miner suffers from the same sort of fluctuation as mines as a whole suffer from. A mine cannot work without railroad cars: a miner cannot work without mine cars.

It takes about twenty minutes to load a ton of coal into a mine car. I timed two men the other day while they were loading coal. It took them eighteen minutes and thirty-five seconds to load two cars, one of which contained 1 ton 2 cwt. and the other 1 ton 5 cwt., which is at a rate better than 1 ton per man in twenty minutes. They were being paid at the rate of 92 cents a ton. But they suffered from the usual conditions of work underground and their total earnings were not very large. Coördination of work is sorely needed in coal mining.

The truth about coal mining will only come out when you take the trouble to go out to the ends of the branch lines of the railroads into the isolated regions where the mines exist. My request can only be that you go into the mines—that you get underground.